

CLAIMS

We claim:

1. An elevator system (20), comprising:
5 a car (22);
a counterweight (24);
a load bearing member (26) supporting the car and the counterweight such that the car moves in one direction and the counterweight moves in an opposite direction;
and
10 a termination (40) associated with at least one end of the load bearing member (26), at least a portion (52) of the termination moving against a first bias (62) responsive to a tension on the load bearing member (26) that is below a selected threshold (78) and moving against a second, passive bias (70) responsive to a tension that exceeds the threshold.
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2. The system of claim 1, wherein the termination (40) includes a terminating member (52) and a support member (60) and wherein the terminating member (52) moves relative to the support member (60) responsive to the tension below the threshold and wherein the support member moves with the terminating member when
20 the tension exceeds the threshold.
3. The system of claim 2, including a damper (70, 80, 82) that resists movement of the support member (60) and wherein the damper at least partially absorbs the tension.
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4. The system of claim 3, wherein the damper comprises at least one of a mechanical spring (70), an air spring (80) or a pressurized actuator (82).
5. The system of claim 3, wherein the damper (70, 80, 82) is preloaded a selected
30 amount (K2) such that the damper prevents movement of the support member (60) when the tension on the load bearing member (26) is less than the selected threshold.

6. The system of claim 2, wherein the terminating member (52) and the support member (60) are moveable relative to a stationary surface (56) and wherein the termination includes a tension member (62) near an end (63) of the terminating member that is distal from the load bearing member (26) between the distal end (63) and the support member (60), the tension member (62) biasing the distal end (63) away from the support member (60) and a damper (70, 80, 82) on an opposite side of the support member between the support member and the stationary surface, the damper biasing the support member away from the stationary surface.
7. The system of claim 6, wherein the tension member (62) comprises a spring and the damper comprises at least one of a mechanical spring (70), an air spring (80), a pneumatic actuator (82) or a hydraulic actuator (82).
8. The system of claim 7, wherein the support member (60) comprises a plank and including a guide structure (54) fixed relative to the stationary surface (56), the guide structure supports the plank such that the plank is moveable toward the stationary surface when the tension exceeds the threshold.
9. The system of claim 1, wherein the termination (40) is supported for movement with the car (22).
10. The system of claim 1, wherein the termination (46) is supported for movement with the counterweight (24).
11. The system of claim 1, including a machine (30) that causes selective movement of the car and wherein the termination (40) is in a fixed position relative to the machine.
12. The system of claim 1, including a first biasing member that provides the first bias and a second biasing member that provides the second bias and is located remote from the first biasing member.

13. A hitch device (40) for securing an end of a load bearing member (26) in an elevator system (20), comprising:

5 a terminating member (52) that is adapted to be secured to a load bearing member (26);

a support member (60) associated with the terminating member;

a first biasing member (62) acting against one side of the support member (60) to bias one end (63) of the terminating member (52) away from the support member (60); and

10 a second, passive biasing member (70, 80, 82) acting against an opposite side of the support member, the second biasing member being adapted to bias the support member away from a selected stationary surface (56).

14. The device of claim 13, wherein the terminating member (52) comprises at least one thimble rod and a clamping mechanism (50) that is adapted to secure a selected portion of the load bearing member in a fixed position relative to the rod.

15. The device of claim 13, wherein the first biasing member (62) comprises a spring and the second biasing member comprises at least one of a mechanical spring (70), an air spring (80), a pneumatic actuator (82) or a hydraulic actuator (82).

16. The device of claim 13, including a guide structure (54) that guides the support member for selective movement against the bias of the second biasing member (70, 80, 82), the guide structure including a stationary surface (56) against which the second biasing member acts such that the support member (60) is selectively moveable relative to the guide structure.

17. The device of claim 16, wherein the terminating member (52) is moveable relative to the guide structure (54) responsive to a first force that opposes the bias of the first biasing member (62) and the support member (60) is moveable with the terminating member (52) against the bias of the second biasing member (70, 80, 82) responsive to a second, greater force.

18. The device of claim 16, wherein the second biasing member (70, 80, 82) is preloaded such that the support member (60) remains stationary relative to the guide structure (54) until the first biasing member (62) is compressed a selected amount.

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19. The device of claim 13, wherein the first biasing member (62) has a first stiffness and the second biasing member (70, 80, 82) has a second, lower stiffness.